

Natural Sciences
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CLIL World

Class Book Pack








with Digital Class Book
& Active Learning Kit

0 What is STEAM? Page 8 • STEAM in action • Women in STEAM • The road to learning and scientific success				
1. Human nutrition Page 12 ▶ Watch.	What organs does the digestive system have?	What organs does the circulatory system have?	What organs does the respiratory system have?	What organs does the excretory system have?
2. Human interaction and reproduction Page 30 ▶ Watch.	How does the nervous system work?	How does the skeletal system work?	How does the muscular system work?	What organs do the female and male reproductive systems have?
Page 48 Project. Learning situation 1 Let's prevent violence against women				
3. Being healthy Page 50 ▶ Watch.	Why do we need to eat healthy?	What are healthy habits?	How can we keep our bodies healthy?	Why is first aid useful?
4. Design and technology Page 68 ▶ Watch.	What are digital devices? ▶ Watch.	How can we search for and analyse information on the Internet? ▶ Watch.	How can we use the Internet safely and follow digital etiquette?	How can you show what you have learned about the Internet?
Page 78 Project. Learning situation 2 Digital presentations				
5. Energy Page 80 ▶ Watch.	What is energy?	How do we use different forms of energy?	Where do non-renewable sources come from?	What are the negative effects of fossil fuels?
6. Electricity Page 100 ▶ Watch.	What are electrically charged objects?	What is electrical energy? ▶ Watch.	What do we need to make an electrical circuit? ▶ Watch.	What are robots?
Page 118 Project. Learning situation 3 Eco-friendly homes				
Page 120	Language activities			

- Language learning lab in every unit
 - WebQuest in every unit
- ▶ Watch. unit videos, content videos and experiment videos

	Science lab Why does the stomach have gastric juices?  Watch.	Story A fascinating trip	Culture Christiaan Barnard STEAM Challenge My model lung	Review & Reflect What have you learned about human nutrition?
What are the stages of growing up?	Science lab How fast are your nervous and locomotor systems?  Watch.	Story Another fascinating trip!	Culture STEAM Challenge My cardboard robotic hand	Review & Reflect What have you learned about human interaction and reproduction?
	Science lab How much fat is in your food?  Watch.	Story Delicious!	Culture STEAM Challenge Build a first aid kit	Review & Reflect What have you learned about being healthy?
What are the advantages of renewable energy?	Science lab How does acid rain affect plants?  Watch.	Story Back to the future	Culture Donna Strickland STEAM Challenge Saving energy leaflet	Review & Reflect What have you learned about energy?
	Science lab What is the difference between a series and a parallel circuit?  Watch.	Story Frankenstein	Culture Kimberley Bryant STEAM Challenge Use a simple circuit to make a machine	Review & Reflect What have you learned about electricity?

Key competences

-  Linguistic communication
-  Science, Technology, Engineering and Mathematical (STEM)
-  Digital
-  Personal, social and learning to learn
-  Entrepreneurship
-  Citizenship
-  Cultural awareness and expression

Meet the STEAM Team!



I'm Shui.
My favourite subject is science. I especially like learning about the human body.

My name is Tahir.
I use technology to learn about different things.

I'm Eric.
I love building things. I want to be an engineer when I grow up.

I'm Ainhoa.
My passion is drawing and painting what I see in the world.

STEAM Education is an approach to learning that uses

- S**cience
- T**echnology
- E**ngineering
- A**rts and
- M**athematics



My name is Malika.
I love maths because it is everywhere in nature!

Do STEAM challenges.

Challenge

My model lung

Can you make a model lung?

Before you start
Lungs are the organs we use for breathing. They're part of the respiratory system. You are going to make a model lung that will fill with air.

- Put your hand on your abdomen and breathe in. What happens as you breathe in? Explain why you think this happens.

You need ...

- 3 balloons
- 2 straws
- a plastic bottle
- plasticine
- scissors
- sticky tape

Planning

- Cut the bottle in half. Be careful!
- Tie one of the balloons and cut off the top. Stretch it around the bottom of the plastic bottle and attach it with sticky tape. This will be the diaphragm.
- Cut one of the straws at the bend. Make a hole in the other straw at the bend. Insert the small part of the first straw into the hole and attach it with sticky tape.
- Attach each straw to a balloon with sticky tape. These will be the lungs.
- Put the straws and the balloons into the neck of the bottle. Use the plasticine to make a seal around the bottle.
- Make it work! Pull the diaphragm down and the lungs should inflate.
- Show your model lung to a classmate and explain how it works. Give your classmate constructive feedback on their model lung.

Ask important questions.

Project Learning situation 1

Eco-friendly homes

An eco-friendly home is a house that's powered by renewable energy sources with little or no waste. It's important that architects design buildings that use fewer fossil fuels. This is better for the environment and it also saves us money on our energy bills.

If we all included eco-friendly features into our homes, it would be a big step to helping the environment. How to build an eco-friendly home:

Insulation
Homes can lose heat through the roof, walls, windows, doors and floors. Insulating means using materials to prevent the energy from escaping. Good insulation keeps homes warmer in winter and cooler in summer.

Reduce, reuse, recycle
Reduce the amount of energy the home needs. Energy saving home products that turn off devices when you aren't using them. Try to fix things instead of throwing them away. In an eco-friendly home we can recycle everything we can, how can you recycle food, waste and water?

The environment
Respect the ecosystem of the site. Which renewable energy sources are most suitable for the weather conditions?
Is it possible to use natural light instead of electricity?
Is it possible to collect rain water?

What is energy?

Energy makes things happen. There are many forms of energy.

- Look at the picture. What forms of energy can you see? **Watch.**

- chemical energy
- electrical energy
- mechanical energy
- nuclear energy
- radiant energy
- sound energy
- thermal energy

Mechanical energy
Mechanical energy = potential energy + kinetic energy

A moving object has kinetic energy. An object at a height has potential energy, or stored energy. When an object moves, this potential energy will be converted into kinetic energy.

- Do the balloon experiment to learn about mechanical energy.

Step 1.
Inflate a balloon. You can use a pump or blow it up with your mouth.

Step 2.
Pinch the end shut with your fingers, to stop the air from escaping. What kind of energy does the balloon have?

Step 3.
Let the air out. What happens? What kind of energy is this?

Solve STEAM activities.

Objects attract or repel each other?

- Object A is positively charged and object B is negatively charged.
- Object A is negatively charged and object B is negatively charged.
- Object A is positively charged and object B is positively charged.
- Object A is negatively charged and object B is positively charged.

Static electricity
There are different types of electricity: static electricity and current electricity. Static electricity develops when the number of protons is not the same as the number of electrons. We create static electricity when we rub objects together because electrons can pass from one object to another. An example of this is when you rub a balloon on your hair.

- How is static electricity used to paint cars? Listen to the podcast and order the sentences. 010

 - The car is taken into a painting booth.
 - The paint for the car is positively charged
 - The paint is attracted to the car and sticks to it.
 - The positively charged paint is sprayed into the booth.

Work in pairs. Test how static electricity works.

- Cut up some small pieces of paper.
- Rub a plastic ruler on your clothing for 30 seconds.
- Hold the ruler above the pieces of paper.

Explain what happens and why in your notebook.

The pieces of paper were attracted to the ruler.

Why were they attracted to the ruler?

At home Try producing static electricity with different objects.

Learn together!

Unit 1 Humans

1 Watch. Name an organ system involved in nutrition.

FREE PARKING **ROLL AGAIN** **GO!**

HUMANS

Be mindful

Listen and do the breathing exercise.

1 Listen and do the breathing exercise.

2 Play the boardgame in pairs. The winner is the first person to have all three organs from the same set.

3 Look at the game. How many organ systems can you name?

4 Order the words and write sentences in your notebook.

- Humans / vertebrates / are / and / they / skeleton / have got / an internal
- Humans / mammals / are / so they / feathers / haven't / got
- live / on planet / Humans / Earth.

Be mindful

Listen and do the breathing exercise.

1 Listen and do the breathing exercise.

Wellbeing activities provide opportunities to refocus and centre students' attention with both mental and physical tasks.

Fun facts about the world

Targeted language support to facilitate comprehension.

Learn about important people and discoveries.

Electrical energy

We can see electrical energy in nature, for example, lightning in a thunderstorm. However, we don't get electricity from lightning, we get electricity from power stations. Electricity travels from the power station to our house through wires in pylons. Finally, electricity enters our homes through the fuse box.

5 Use a dictionary or the Internet. Write the definitions for the following words in your notebook.

- power station
- pylon
- fuse box

Electrical conductors and insulators

Electricity flows through some materials which we call electrical conductors. Materials that don't allow electricity to flow are called electrical insulators.

6 Work in pairs. Which of the following materials are electrical conductors?

- aluminium
- wood
- plastic
- glass
- rubber
- metal

7 Answer the questions in your notebook.

- Why are wires made from copper?
- Why are wires covered in a layer of plastic?

Transformation of electrical energy

Electrical objects turn electrical energy into other forms of energy. For example, a light bulb turns electrical energy into light energy.

8 In your notebook, write sentences about each of the following energy transformations.

- light bulb
- toaster
- hair dryer
- fan
- electric kettle
- electric heater
- electric fan
- electric lamp

At home How is electrical energy transformed in your home?

Language learning lab

Tip 1

Using picture dictionaries

Picture dictionaries are useful to organise the important words you want to remember.

4 Choose five words in this unit. Write the definition of each word and draw a picture.

My science picture dictionary

Stomach: An organ which is part of the digestive system. Stomach juices break down food here.

Tip 2

Using key words

Read the questions and write down the key words to help you answer them in your notebook.

- Use the Internet to find the answers to the questions.
 - What smells made of?
 - What is the function of the olfactory cells?
 - Where do the olfactory nerves transmit the impulses?
 - What does the hair inside your nostrils do?
 - Where are the taste buds?
 - What does smoking do to the tongue?
 - How can you treat a burn on the tongue?
 - How many times a day should you brush your teeth?

Tip 3

Using diagrams

Diagrams are very good for learning. Write simple, direct sentences or words.

3 Copy and complete the diagram in your notebook.

Reproduction

Diagram showing a tree structure with 'Reproduction' at the top, branching into 'Sexual' and 'Asexual', which further branch into 'Sexual' and 'Asexual' respectively.

CULTURE

Donna Strickland (1959)

Donna Strickland is a physicist from Canada. She was born in Guelph, Ontario in 1959. Her mother was a teacher and her father was an electrical engineer. She studied engineering physics at university and was particularly interested in lasers and electro-optics. She did her doctoral research in the Laboratory for Laser Energetics in the United States. Donna Strickland improved laser technology to develop a much more precise cutting tool. This is very useful for surgeons as it helps make many operations safer for patients. Donna Strickland's work has allowed doctors to carry out millions of successful corrective eye surgeries. Her technology has also helped dentists treat tooth problems, surgeons to remove tattoos, and artists to draw and write pictures and words on objects of many different kinds. Donna Strickland and her colleague Gérard Mourou won the Nobel Prize for Physics in 2018.

Answer the questions.

- Where's Donna Strickland from?
- What did her mother do?
- Why was her work important?
- When did she get a Nobel Prize?

WebQuest

2 Do the WebQuest. Do you know Elon Musk? Answer the questions in your notebook.

- Who is Elon Musk?
- When was he born?
- Where was he born?
- Elon Musk is the CEO of which company?
- What does the company do?

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Key competence activities: a combination of knowledge, skills and attitudes.

Science lab

How does acid rain affect plants?

When factories and power stations burn non-renewable sources of energy, they emit pollutant gases. These gases mix with the water in clouds and form acid rain. We can simulate acid rain using vinegar and water, as vinegar is an acid.

Hypothesis
What do you think will happen?
Write your hypothesis.

Materials

- 2 labels
- 2 plants
- 2 spray bottles
- a measuring jug
- a pen
- stickers
- vinegar
- water

Step 1
Fill one spray bottle with 400 ml of water. Write and stick a label on the bottle: 1. Water

Step 2
Fill the other spray bottle with 200 ml of vinegar and 200 ml of water. Write and stick a label on the bottle: 2. Vinegar and water

Step 3
Put stickers on the plants: A and B. Put the plants in a sunny place. Once a day spray plant A with the water and spray plant B with the vinegar and water solution.

Step 4
Take a look at the plants every day and write notes.

Results
Compare your results with a classmate. Fill in the worksheet.

Watch 003

Science experiments

Challenge

Saving energy leaflet

Before you start
1 Listen to the podcast. What important information does Shui give? 4) 003

You need...

- a pencil
- coloured pencils
- paper

Planning
2 Read Shui's leaflet. In groups, make stickers of her tips to put around your school.

My useful tips
By Shui

In my school we use a large amount of energy and we waste a lot too. We must think about how we can stop wasting energy in class. For example, we waste energy by leaving the lights on when we are in the playground. We also leave the heating on in the winter and the air conditioning on in the summer.

Here are my tips for saving energy:

- Tip 1:** Let's turn off the lights when we leave the room. I volunteer to leave the room last every day and turn off the lights.
- Tip 2:** We should keep the door of the classroom closed. This keeps the room warm in winter and saves on the heating.
- Tip 3:** I suggest that we start using solar panels to generate electricity. In Spain, there are a lot of sunny days!
- Tip 4:** Don't put the heating on the air conditioning on too high.
- Tip 5:** Let's use energy efficient LED light bulbs. They consume much less energy than a normal bulb. LED bulbs last much longer.

3 Talk to a classmate.

- What's the purpose of Shui's leaflet?
- What information does she include?
- What do you like about Shui's leaflet?
- How could you improve Shui's leaflet?

4 Create a leaflet or podcast about saving energy.

5 Share your project with your classmates.

6 Give your classmates constructive feedback.

STEAM challenges

Learning situations to solve real life challenges.

Project Learning situation 1

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Try to fix things instead of throwing them away.
In an eco-friendly home we recycle everything we can. How can you recycle food, waste and water?

What's an eco-friendly home?

You are designing a home. How can you make it eco-friendly?

- Collaborate and research** Find out ways to build an eco-friendly home.
- Plan your design.** Answer the questions in your notebook.
 - Which renewable energy sources can you use to power the home?
 - How can you save energy in the home? Remember:
 - It needs to keep heat inside in the winter.
 - It needs to stay cool in the summer.
 - How can you reduce waste in the home?
- Choose an activity to show what you have learned.** Include the information from your notes.

Draw a plan | Make a model | Write a description | Check

- Share** Show your project to your classmates.
- Evaluate** Give your classmates constructive feedback. Answer the questions.
 - Are the homes powered by renewable energy sources?
 - How your classmates explained how the home conserves energy and reduces waste?
 - What do you like about your classmates' designs?
 - How could your classmates improve their designs?

Learn about the 17 sustainable development goals.

Digital resources to advance learning

WebQuest

Watch.

003

Further digital practice through the ...

